

# PATENT ABSTRACTS OF JAPAN

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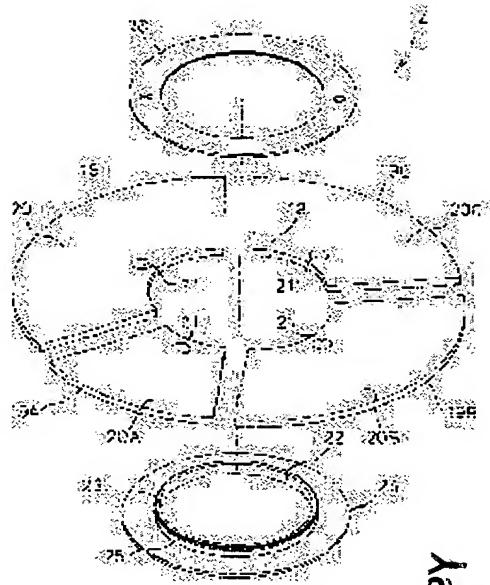
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## (54) COLOR WHEEL AND MOTOR HAVING THE SAME

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To provide a color wheel that enables reliable identification of front and back, effectively obstructs a mistake in installation, enables the easy formation of an optical film, and can be manufactured at low costs and to provide a motor having the color wheel.

**SOLUTION:** The color wheel comprises a plurality of division color wheel bodies formed in a fan shape so that disk shape whose center section has a mounting hole is achieved; the different optical films formed on the surface of the division color wheel body; an identification means for identifying the front and back of the division color wheel body; and a support for supporting the division color wheel body in the disk shape.



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**CLAIMS**

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[Claim(s)]

[Claim 1]

The color wheel characterized by consisting of a discernment means to identify the division color wheel body which has a mounting hole in the center section, and which was formed in two or more flabellate forms so that it might become disc-like, different optical film formed by the front face of this division color wheel body, respectively, and the front face and rear face of said division color wheel body, and support which supports said division color wheel body disc-like.

[Claim 2]

The color wheel characterized by consisting of the division color wheel body with which the right-and-left [ which have a mounting hole in the center section ] part which become disc-like and can identify a front face and a rear face was formed at two or more flabellate forms of an unsymmetrical configuration, different optical film formed by the front face of this division color wheel body, respectively, and support which supports said division color wheel body disc-like.

[Claim 3]

A base plate and the shaft of this base plate fixed so that it might project mostly more nearly up than a center section, So that the periphery section of the sleeve arranged through gas space at the periphery section of this shaft, the permanent magnet attached in the periphery section of this sleeve, and this permanent magnet may be countered While supporting the coil attached in said base plate, and said sleeve and said permanent magnet The division color wheel body which has a mounting hole in the center section in which the upper part of said shaft was attached by the periphery section of a wrap hub and this hub and which was formed in two or more flabellate forms so that it might become disc-like, Different optical film formed by the front face of this division color wheel body, respectively, The motor equipped with the color wheel characterized by having the color wheel which consists of support which supports a discernment means to identify the front face and rear face of said division color wheel body, and said division color wheel body, disc-like.

[Claim 4]

A base plate and the shaft of this base plate fixed so that it might project mostly more nearly up than a center section, So that the periphery section of the sleeve arranged through gas space at the periphery section of this shaft, the permanent magnet attached in the periphery section of this sleeve, and this permanent magnet may be countered While supporting the coil attached in said base plate, and said sleeve and said permanent magnet The back yoke attached in said hub so that the upper part of said shaft might be located in a wrap hub and the periphery section of said coil, Have a mounting hole in the center section attached in this back yoke or the periphery section of said hub, and it becomes disc-like. The division color wheel body with which the right-and-left part which can identify a front face and a rear face was formed in two or more flabellate forms of an unsymmetrical configuration, The motor equipped with the color wheel characterized by having the color wheel which consists of support which supports different optical film formed by the front face of this division color wheel body, respectively, and said division color wheel body disc-like.

[Claim 5]

A base plate and the shaft of this base plate fixed so that it might project mostly more nearly up than a center section, So that the periphery section of the sleeve arranged through gas space at the periphery section of this shaft, the permanent magnet attached in the periphery section of this sleeve, and this permanent magnet may be countered While supporting the core loess wave continuation coil attached in said base plate, the back yoke

prepared so that it might be located in the periphery section of this coil, and said sleeve, a permanent magnet and a back yoke The division color wheel body which has a mounting hole in the center section in which the upper part of said shaft was attached by a wrap hub, this hub, or the periphery section of said back yoke and which was formed in two or more flabellate forms so that it might become disc-like, Different optical film formed by the front face of this division color wheel body, respectively, The motor equipped with the color wheel characterized by having the color wheel which consists of support which supports a discernment means to identify the front face and rear face of said division color wheel body, and said division color wheel body, disc-like.

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**DETAILED DESCRIPTION**

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**[Detailed Description of the Invention]**

[0001]

**[Field of the Invention]**

This invention relates to the motor equipped with the color wheel and color wheel which are used for a projector, image pick-up equipment, etc.

[0002]

**[Description of the Prior Art]**

Conventionally, this kind of color wheel divides into four pieces or six flabellate forms of predetermined magnitude the front face of the disc-like color wheel body made from glass material with which the mounting hole was formed in the center section, and this color wheel body, and consists of different optical film formed by this part, respectively.

[0003]

**[Problem(s) to be Solved by the Invention]**

When attaching in the periphery section of mho TABABU etc., while the conventional color wheel has the fault of being hard to distinguish a front face and a rear face, and attaching conversely In order to form in the front face of a disc-like color wheel body optical film which divides into four pieces or six flabellate forms, and is different, when one optical film was formed, it had to work having had to mask other parts and there was a fault of trouble having started formation of the optical film and becoming cost quantity.

[0004]

While this invention can identify a front face and a rear face certainly and prevents an anchoring mistake efficiently in view of the above conventional faults, the optical film can also be formed easily and it aims at offering the motor equipped with the color wheel and color wheel which can be manufactured by low cost.

[0005]

As new along [ said ] this invention a description as the other purposes will become clear more completely, if the next explanation is checked with an accompanying drawing and read.

However, a drawing is a thing for description chiefly and does not limit the technical range of this invention.

[0006]

**[Means for Solving the Problem]**

In order to attain the above-mentioned purpose, this invention constitutes the color wheel from a discernment means to identify the division color wheel body which has a mounting hole in the center section and which was formed in two or more flabellate forms so that it might become disc-like, different optical film formed by the front face of this division color wheel body, respectively, and the front face and rear face of said division color wheel body, and support which supports said division color wheel body disc-like.

[0007]

This invention Moreover, a base plate and the shaft of this base plate fixed so that it might project mostly more nearly up than a center section, So that the periphery section of the sleeve arranged through gas space at the periphery section of this shaft, the permanent magnet attached in the periphery section of this sleeve, and this permanent magnet may be countered While supporting the coil attached in said base plate, and said sleeve and said permanent magnet The division color wheel body which has a mounting hole in the center section in which the upper part of said shaft was attached by the periphery section of a wrap hub and this hub and which was formed in two or more flabellate forms so that it might become disc-like, Different optical film formed by the

front face of this division color wheel body, respectively, The motor equipped with the color wheel equipped with the color wheel which consists of support which supports a discernment means to identify the front face and rear face of said division color wheel body, and said division color wheel body, disc-like is constituted.

[0008]

[Embodiment of the Invention]

Hereafter, the gestalt of operation shown in a drawing explains this invention to a detail.

[0009]

It is the motor by which 1 was equipped with the color wheel of this invention in the gestalt of operation of the 1st of this invention shown in drawing 1 thru/or drawing 6. The base plate 4 with which the insertion holes 3, 3, and 3 of the bis-2 grade for anchoring of plurality [ motor / 1 / equipped with this color wheel / section / periphery ] were formed, The shaft 5 of this base plate 4 fixed so that it might project mostly more nearly up than a center section, The sleeve 7 arranged through the gas space 6 which constitutes a gas dynamic pressure bearing at the periphery section of this shaft 5, One volume attached in said base plate 4 in the state of immobilization so that the periphery section of the permanent magnet 8 attached in the periphery section of this sleeve 7 and this permanent magnet 8 might be countered, The core loess wave continuation coil 9 of 3-fold volume tubed with the gestalt of operation of this inventions, such as a double volume and 3-fold volume, While supporting a back yoke 10, and said this sleeve 7 and permanent magnet 8 in the state of immobilization, [ the back yoke 10 prepared so that it might be located in the periphery section of this core loess wave continuation coil 9, and ] With the gestalt of operation of the upper part of said shaft 5 of the wrap hub 11, this hub 11 or said back yoke 10, and this invention, were attached in the back yoke 10 with covering 12 and an electrode holder 13. The color wheel 14 which projects to a way outside the direction of an axial center of said shaft 7, and the direction of a right angle, So that it may function as a stopper of the vertical direction where said shaft 5 is adsorbed by the inside section of the thrust magnet 16 of the shape of a ring fixed to the crevice 15 of the upper part of the wrap hub 11, and this thrust magnet 16 It consists of thrust magnets 17 fixed to the upper part of said shaft 5.

[0010]

The division color wheel bodies 19, 19A, 19B, and 19C made from a glass plate with which said color wheel 14 was formed in the center section at four flabellate forms which have a mounting hole 18, and from which two or more magnitude differs with the gestalt of operation of this invention so that it might become disc-like, Different optical film 20, 20A, 20B, and 20C formed by vacuum evaporationo, sputtering, etc., respectively on the front face of these division color wheel bodies 19, 19A, 19B, and 19C, Identify the front face and rear face of said division color wheel bodies 19, 19A, 19B, and 19C. The marks 21, 21, 21, and 21 as a discernment means by which the colors of the front face and rear face which were established in the part of the mounting hole 18 approach of these division color wheel bodies 19, 19A, 19B, and 19C differ, The mounting hole 22 which supports said division color wheel bodies 19, 19A, 19B, and 19C by said mounting hole 18 part disc-like was formed. It consists of support 27 with which a cylinder 23 consists of a disc-like covering plate 26 of a configuration which is different from the disc-like support plate 24 formed in the center section, and the thread part 25 formed in the point of cylinder 23 part of this support plate 24 in this support plate 24 to screw.

In addition, said division color wheel bodies 19, 19A, 19B, and 19C can use that by which cutting processing was carried out for the flabellate form of required magnitude, after forming optical film 20, 20A, 20B, and 20C which is different in a big glass plate, respectively.

That is, in the membrane formation activity of the optical film 20, 20A, 20B, and 20C, since one kind of optical film is formed to the glass plate of one sheet, the activity of masking etc. is unnecessary and can manufacture easily.

Moreover, with the gestalt of operation of this invention, in attaching a color wheel 14 in a back yoke 10, it distinguishes a front face and a rear face with the covering plate 26 or support plate 24 of support 27.

[0011]

Since the motor 1 equipped with the color wheel of the above-mentioned configuration arranges the permanent magnet 8 and the core loess wave continuation coil 9 in the periphery section of the sleeve 7 arranged through the gas space 6 in the periphery section of a shaft 5, it is completely lost from the magnetic circuit which generates turning effort. [ of the harmful force applied to a shaft 5 and a sleeve 7 ]

For this reason, there should just be bearing rigidity supporting the self-weight of the body of revolution which

consists of a sleeve 7, a permanent magnet 8, and hub 11 grade fundamentally.

[0012]

[The gestalt of the operation from which invention differs]

Next, it explains per gestalt of the operation from which this invention shown in drawing 7 thru/or drawing 17 differs. In addition, the explanation which gives the same sign to the same component as the gestalt of operation of the 1st of said this invention, and overlaps is omitted in explanation of the gestalt of the operation from which these this inventions differ.

[0013]

In the gestalt of operation of the 2nd of this invention shown in drawing 7 thru/or drawing 9, a mainly different point from the gestalt of operation of the 1st of said this invention While using color wheel 14A using a discernment means by which the notches 28, 28, 28, and 28 from which right and left serve as an unsymmetrical configuration in the part of the mounting hole 18 approach of the division color wheel bodies 19, 19A, 19B, and 19C were formed Cover the periphery section of a back yoke 10 and this back yoke 10 in that said color wheel 14A was attached in the periphery section of cylinder part material 11a of wrap hub 11A Thus, the same operation effectiveness as the gestalt of operation of the 1st of said this invention as for motor 1A equipped with the constituted color wheel is acquired.

[0014]

In the gestalt of operation of the 3rd of this invention shown in drawing 10 thru/or drawing 12, a mainly different point from the gestalt of operation of the 1st of said this invention While using color wheel 14B using the discernment means of the part of the mounting hole 18 approach of the division color wheel bodies 19, 19A, 19B, and 19C which, on the other hand, formed notches 29, 29, 29, and 29 in the part of approach It is the point which fixed the back yoke 10 to the base plate 4, and the same operation effectiveness as the gestalt of operation of the 1st of said this invention as for motor 1B equipped with the color wheel constituted in this way is acquired.

[0015]

In the gestalt of operation of the 4th of this invention shown in drawing 13 and drawing 14, a mainly different point from the gestalt of operation of the 2nd of said this invention is a point of having used wrap hub 11B for the periphery section of the core loess wave continuation coil 9 by cylinder part material 11a, and the same operation effectiveness as the gestalt of operation of the 2nd of said this invention as for motor 1C equipped with the color wheel which does not use a back yoke in this way is acquired.

[0016]

In the gestalt of operation of the 5th of this invention shown in drawing 15, a mainly different point from the gestalt of operation of the 1st of said this invention While arranging a back yoke 10 in the periphery section of a sleeve 7, it is the point which has arranged the permanent magnet 8 in the periphery section of the core loess wave continuation coil 9, and the same operation effectiveness as the gestalt of operation of the 1st of said this invention as for motor 1D equipped with the color wheel constituted in this way is acquired.

[0017]

In the gestalt of operation of the 6th of this invention shown in drawing 16, a mainly different point from the gestalt of operation of the 1st of said this invention Sleeve 7A fixed on two or more screws 30 so that it might project upwards to the base plate 4, While supporting shaft 5A arranged through the gas space 6 in this sleeve 7A, this shaft 5A, a permanent magnet 8, and a back yoke 10 The same operation effectiveness as the gestalt of operation of the 1st of said this invention as for motor 1E equipped with the color wheel which is a point using wrap hub 11C, and constituted the upper part of said sleeve 7A in this way is acquired.

[0018]

In the gestalt of operation of the 7th of this invention shown in drawing 17, a mainly different point from the gestalt of operation of the 6th of said this invention While arranging a back yoke 10 in the periphery section of sleeve 7A, it is the point which has arranged the permanent magnet 8 in the periphery section of the core loess wave continuation coil 9, and the same operation effectiveness as the gestalt of operation of the 6th of said this invention as for motor 1F [ equipped with the color wheel constituted in this way ] is acquired.

[0019]

In addition, although the gestalt of each operation of said this invention explained what uses the core loess wave continuation coil 9 as a coil, this invention may use coils not only this but other than core loess wave

continuation coil 9.

Moreover, color wheels 14, 14A, and 14B may be attached in the motor using the gas dynamic pressure bearing currently generally used from the former.

Furthermore, the discernment means 21, 28, and 29 may be formed in the part which projects from support 27 so that a front face and a rear face can be identified also in the state of the attached color wheels 14, 14A, and 14B.

[0020]

[Effect of the Invention]

If it is in this invention so that clearly from the above explanation, the effectiveness of next enumerating is acquired.

[0021]

(1) The division color wheel body which has a mounting hole in the center section and which was formed in two or more flabellate forms so that it might become disc-like, Different optical film formed by the front face of this division color wheel body, respectively, Since it consists of a discernment means to identify the front face and rear face of said division color wheel body, and support which supports said division color wheel body disc-like, after forming each optical film, it can cut in a predetermined dimension and can arrange disc-like. Therefore, the membrane formation activity of the optical film is easy, and can manufacture cheaply.

[0022]

(2) It can prevent efficiently that can perform discernment from a front face and a rear face easily, and it attaches accidentally with the above (1).

[0023]

(3) With the above (1), since different optical film is formed, respectively, although the optical film is formed making a mask the disk of one sheet like before, like, it is not discovered after forming two or more optical film by discovery of a defective, and a defective can be removed economically.

[0024]

(4) The effectiveness as aforementioned (1) - (3) also with same claim 2 is acquired.

[0025]

(5) A base plate and the shaft of this base plate fixed so that it might project mostly more nearly up than a center section, So that the periphery section of the sleeve arranged through gas space at the periphery section of this shaft, the permanent magnet attached in the periphery section of this sleeve, and this permanent magnet may be countered While supporting the coil attached in said base plate, and said sleeve and said permanent magnet The division color wheel body which has a mounting hole in the center section in which the upper part of said shaft was attached by the periphery section of a wrap hub and this hub and which was formed in two or more flabellate forms so that it might become disc-like, Different optical film formed by the front face of this division color wheel body, respectively, Since it consists of color wheels which consist of support which supports a discernment means to identify the front face and rear face of said division color wheel body, and said division color wheel body, disc-like The above (1) While the same effectiveness as - (3) is acquired, the harmful force applied to a shaft and a sleeve is removable from the magnetic circuit which generates turning effort.

Therefore, while being able to make bearing rigidity small, vibration resulting from radial anti-rigidity can also be made small, and high-speed rotation is possible, it excels in endurance, and the low noise can be planned.

[0026]

(6) Iron hysteresis loss and overcurrent loss can be lessened with the above (5).

Therefore, the effectiveness of aiming at reduction of loss is acquired.

[0027]

(7) With the above (5), since bearing rigidity can be made small, energy for surfacing a bearing can be lessened.

Therefore, reduction of bearing loss can be aimed at and effectiveness can be gathered.

[0028]

(8) With the above (5), when the ripple of the detent torque of a hand of cut is completely lost, vibration resulting from this and generating of a sound can be abolished.

[0029]

(9) The effectiveness as aforementioned (4) - (8) also with same claims 4 and 5 is acquired.

**[Brief Description of the Drawings]**

Drawing 1] The front view of the gestalt of operation of the 1st of this invention.

Drawing 2] The top view of the gestalt of operation of the 1st of this invention.

Drawing 3] The sectional view which meets three to 3 line of drawing 1 .

Drawing 4] The decomposition explanatory view of the gestalt of operation of the 1st of this invention.

Drawing 5] The sectional view which meets five to 5 line of drawing 1 .

Drawing 6] The decomposition explanatory view of the color wheel of the gestalt of operation of the 1st of this invention.

Drawing 7] The sectional view of the gestalt of operation of the 2nd of this invention.

Drawing 8] The decomposition explanatory view of the gestalt of operation of the 2nd of this invention.

Drawing 9] The decomposition explanatory view of the color wheel of the gestalt of operation of the 2nd of this invention.

Drawing 10] The sectional view of the gestalt of operation of the 3rd of this invention.

Drawing 11] The decomposition explanatory view of the gestalt of operation of the 3rd of this invention.

Drawing 12] The decomposition explanatory view of the color wheel of the gestalt of operation of the 3rd of this invention.

Drawing 13] The sectional view of the gestalt of operation of the 4th of this invention.

Drawing 14] The decomposition explanatory view of the gestalt of operation of the 4th of this invention.

Drawing 15] The sectional view of the gestalt of operation of the 5th of this invention.

Drawing 16] The sectional view of the gestalt of operation of the 6th of this invention.

Drawing 17] The sectional view of the gestalt of operation of the 7th of this invention.

**[Description of Notations]**

1, 1A-1F: The motor equipped with the color wheel,

2: Screw 3: Insertion hole,

4: Base plate 5 5A: Shaft,

6: Gas space 7 7A: Sleeve,

8: Permanent magnet,

9: Core loess wave continuation coil,

10: Back yoke,

11, 11A, 11B, 11C: Hub,

12: Covering 13: Electrode holder,

14, 14A, 14B: Color wheel,

15: Crevice,

16: Thrust magnet,

17: Thrust magnet,

18: Mounting hole,

19, 19A, 19B, 19C: Division color wheel body,

20, 20A, 20B, 20C: Optical film,

21: The mark as a discernment means,

22: Mounting hole 23: Cylinder,

24: Support plate 25: \*\*\*\* hole,

26: Covering plate 27: Support,

28: The notch as a discernment means,

29: The notch as a discernment means.

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[Translation done.]

**\* NOTICES \***

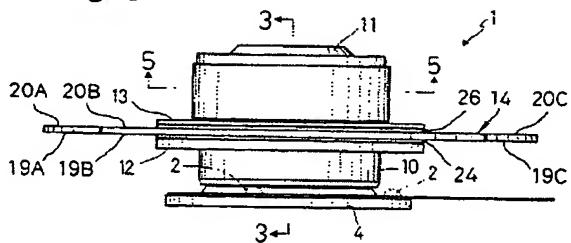
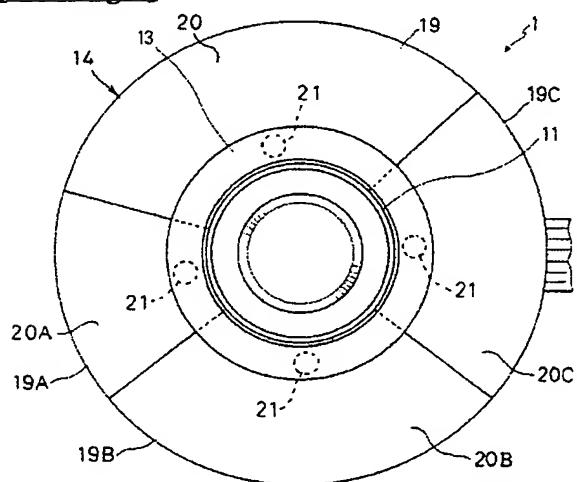
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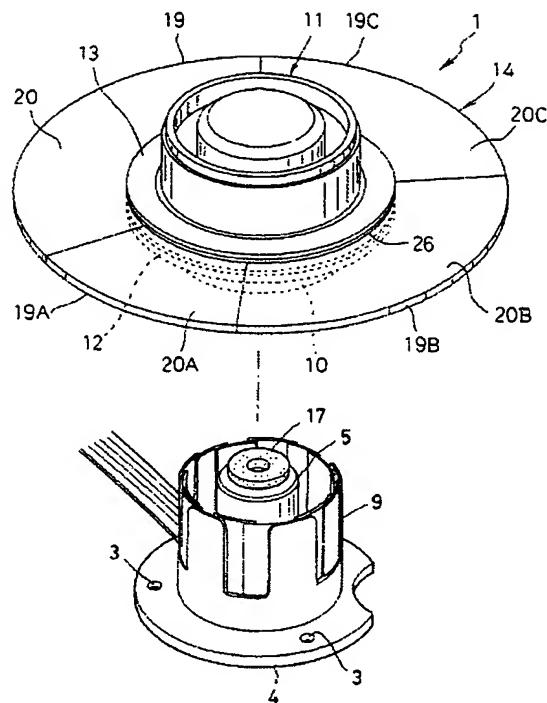
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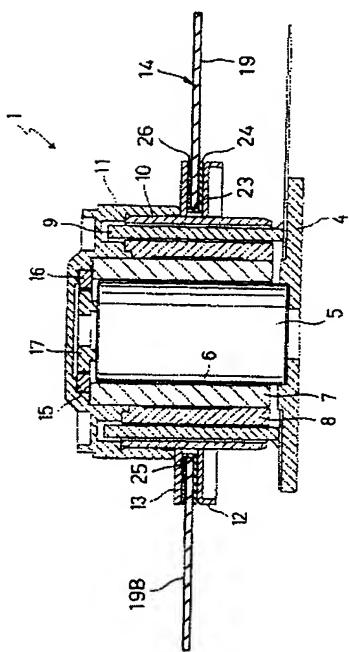
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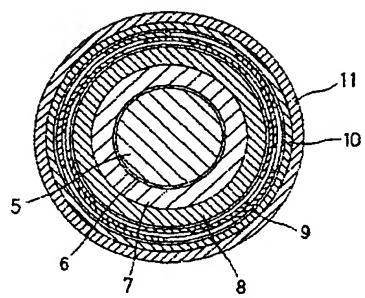
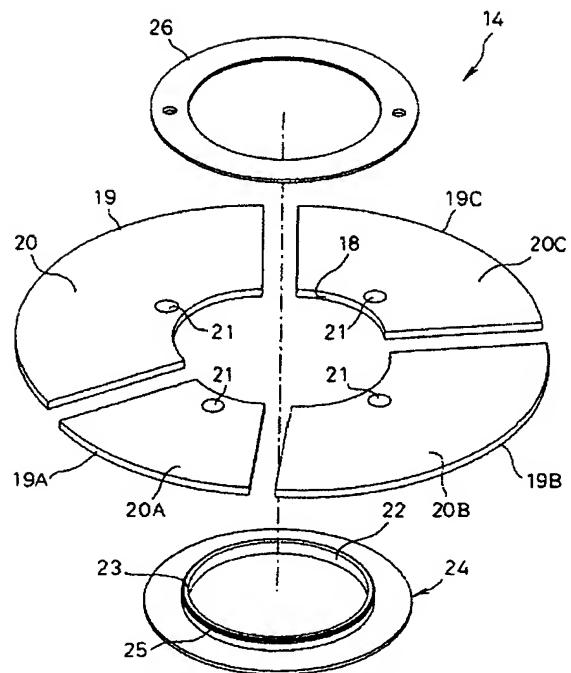
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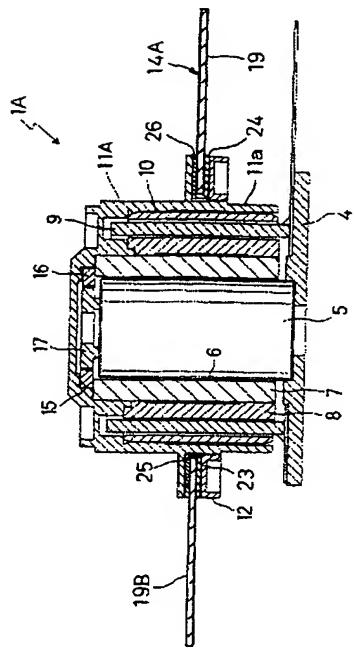
**[Drawing 1]****[Drawing 2]****[Drawing 3]**



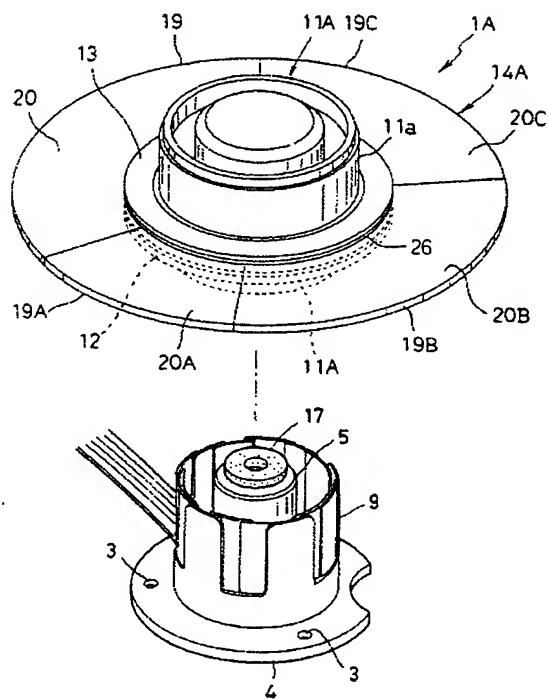
[Drawing 4]



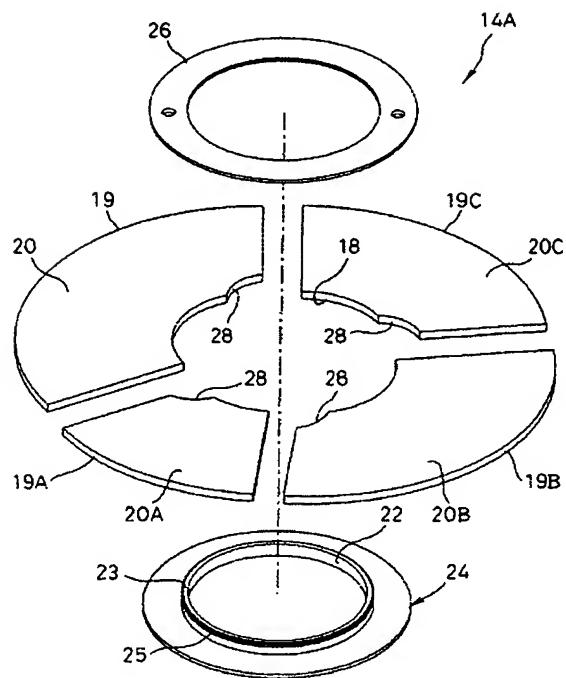
[Drawing 5][Drawing 6][Drawing 7]



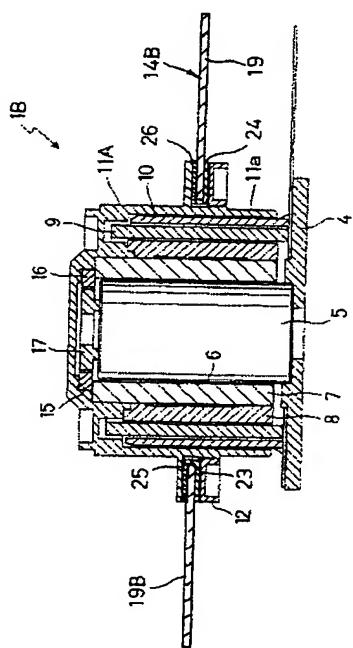
[Drawing 8]



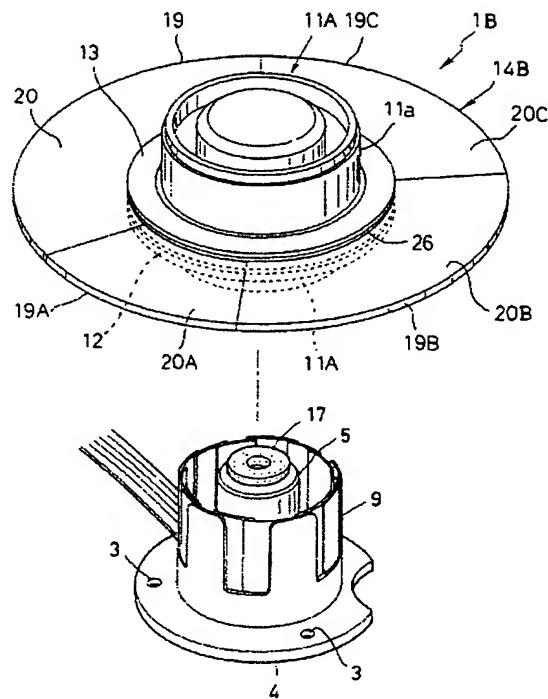
[Drawing 9]



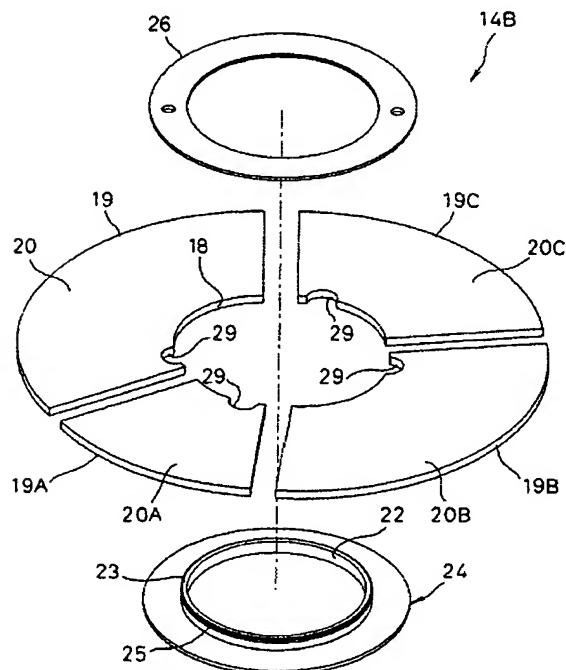
### [Drawing 10]



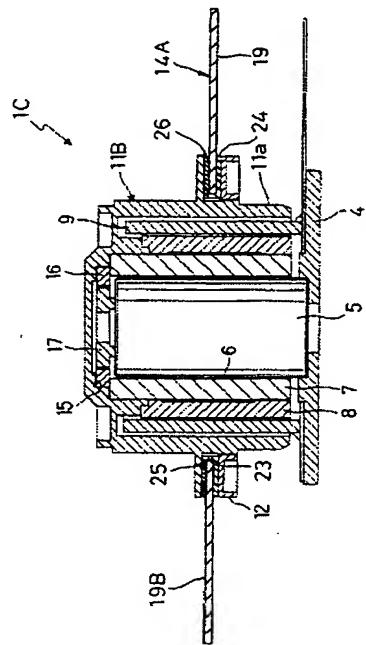
### [Drawing 11]



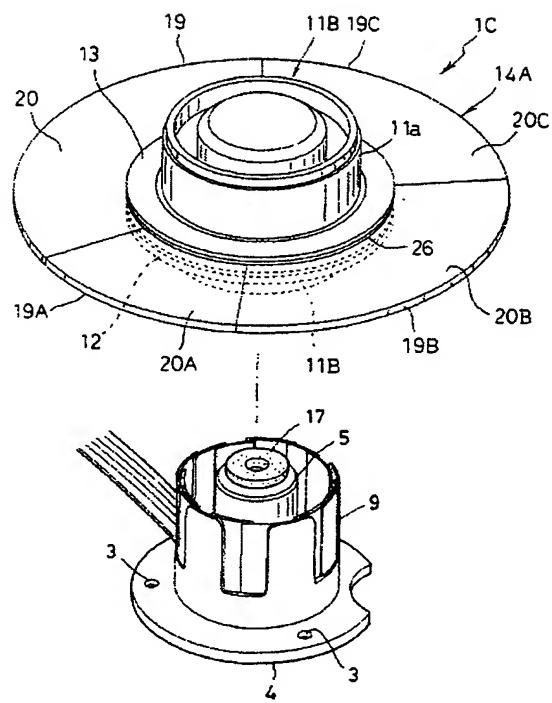
[Drawing 12]



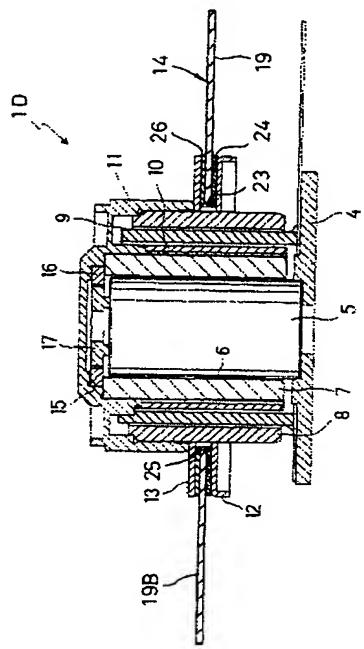
[Drawing 13]



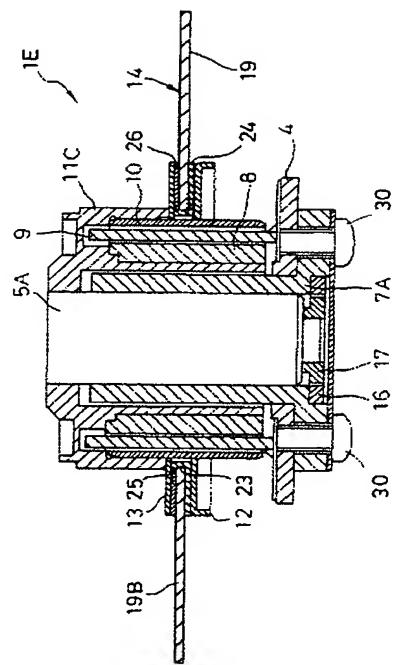
[Drawing 14]



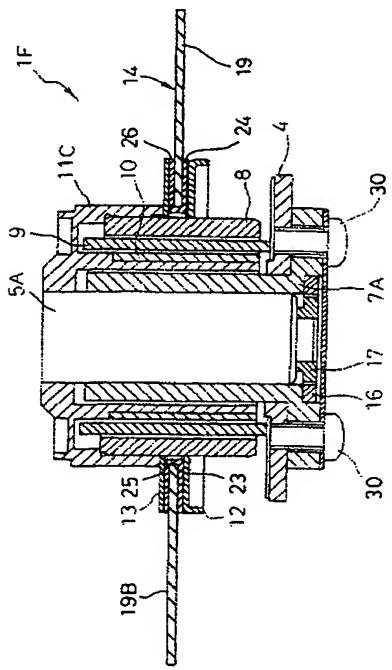
[Drawing 15]



[Drawing 16]



[Drawing 17]



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